

## 29604 - Chemistry

### Syllabus Information

**Academic year:** 2023/24

**Subject:** 29604 - Chemistry

**Faculty / School:** 110 - Escuela de Ingeniería y Arquitectura

**Degree:** 430 - Bachelor's Degree in Electrical Engineering

**ECTS:** 6.0

**Year:** 434 - Bachelor's Degree in Mechanical Engineering: 1

330 - Complementos de formación Máster/Doctorado: XX

**Semester:** 434-First semester o Second semester

330-First semester o Second semester

107-First semester

**Subject type:** 434 - Basic Education

330 - ENG/Complementos de Formación

**Module:**

### 1. General information

The aim is for students to acquire a general vision of Chemistry and its importance in our society and to be able to apply the theoretical and practical knowledge acquired in the development of their profession as industrial engineers.

In order to take this subject, it is necessary to have acquired the competences of the previous educational stages, being advisable to take Chemistry in the Baccalaureate.

These approaches and objectives are aligned with some of the Sustainable Development Goals (SDGs) of the Agenda 2030, (<https://www.un.org/sustainabledevelopment/es/>) in such a way that the acquisition of the learning outcomes of the subject provides training and competence to the student to contribute to some extent to the achievement of Target 3.9 of Goal 3; Target 6.3. of Goal 6; Target 13.3. of Goal 13 and Target 9.5. of Goal 9.

### 2. Learning results

1. Master the basic principles of general chemistry, organic chemistry and inorganic chemistry.
2. Manage the basic laws that regulate reactions: thermodynamics, kinetics and equilibrium.
3. Solve exercises and problems in a complete and reasoned way.
4. Proper use of the theoretical concepts in the laboratory through the correct and safe use of the basic material and of the equipment.
5. Use rigorous language in chemistry.
6. Present and interpret data and results.

### 3. Syllabus

#### **Block I. Basic chemistry concepts I**

1. Atoms: atomic model and electronic structure. Periodic classification of the elements. Nomenclature. Ways to express concentration. Chemical equation and stoichiometry. Classification of chemical reactions.

#### **Block II. Chemical thermodynamics, chemical kinetics and chemical equilibrium**

2. Kinetic and thermodynamic aspects of chemical reactions
3. Chemical equilibrium
4. Ionic equilibria
5. Oxidation-reduction reactions and electrochemistry

#### **Block III. Basic chemistry concepts II**

6. Periodic properties of the elements
7. Chemical bonding: ionic, covalent and metallic. Intermolecular forces.
8. States of aggregation of matter and phase changes
9. Physical properties of solutions

#### **Block IV. Introduction to organic and inorganic chemistry**

10. Elements of the main groups: metals and nonmetals. Carbon compounds.

## 4. Academic activities

Participative lectures: 30 h

Class problems and questions: 20 h

Laboratory practices: 10 h (5 sessions of 2h)

Personal work and tutorials: 83 h

Assessment tests. 7 h

The subject seeks to promote the active learning of students. The lectures will be complemented with the rest of the proposed activities: solving questions and problems, attending tutorials and laboratory practices. The laboratory practices are oriented to help students acquire skills in the handling of laboratory material; develop their deductive, communicative and teamwork abilities; know the safety rules in laboratories and the correct handling of chemical substances.

## 5. Assessment system

A minimum grade of 5 is required to pass the subject. Throughout the semester, different assessment tests will be scheduled. Failure to take any of them does not exclude the possibility of taking the rest of the tests.

1. First partial (P1). Written test on the contents of topics 1 to 4 of the course, which will include questions of nomenclature, theoretical-practical questions and problem solving.
2. Second partial (P2). Written test that will include theoretical-practical questions and problem solving on the contents of topics 5 to 9.
3. Laboratory (L). Its evaluation will be based on the completion of the laboratory practices, homework and a written test, which will be taken together with the exam of the second midterm.

In order to be able to average the three parts, a minimum grade of 4 is required in each of them. The final grade will be:  $0.5 \cdot P1 + 0.4 \cdot P2 + 0.1 \cdot L$

### Global assessment 1st call.

Those students who have not passed the course must take an exam of at least the pending part or parts (<4) in the global test scheduled by the center. This test may also be taken by those students who wish to improve their grade, in which case the best of the grades obtained shall prevail.

Those students who have not completed the laboratory practicals must take, in addition to the written exam, a practical exam in the laboratory.

The final grade will be calculated as follows:  $0.5 \cdot P1 + 0.4 \cdot P2 + 0.1 \cdot L$

### Global assessment 2nd call.

The evaluation will be carried out by means of a written exam that will deal with all the theoretical and practical concepts covered in the subject. Any grades obtained in previous exams will not be taken into account.

Those students who have not completed the laboratory practicals must take, in addition to the written exam, a practical exam in the laboratory.